Badger Meter Europa GmbH

FMS Compact

Fluid Management System

USER MANUAL

July 2013

Firmware v3.7 until v5.16

LMS_FMS Compact_BA_02_1307

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1. Basic safety recommendations

Before installing or using this product, please read this instruction manual thoroughly.
Only qualified personnel should install and/or repair this product. If a fault appears, contact your distributor.

Installation
Do not place any unit on an unstable surface that may allow it to fall.
Never place the units above a radiator or heating unit.
Route all cabling away from potential hazards.
Isolate from the mains before removing any covers.

Power connection
Use only the type of power source suitable for electronic equipment. If in doubt, contact your distributor. Ensure that any power cables are of a sufficiently high current rating.
All units must be earthed to eliminate risk of electric shock.
Failure to properly earth a unit may cause damage to that unit or data stored within it.

Protection class
The device has protection class IP 42 and needs to be protected against dripping water, water, oils, etc.

Setup & operation
Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage, incorrect operation or loss of data.

Cleaning
Switch off all units and isolate from mains before cleaning.
Clean using a damp cloth. Do not use liquid or aerosol cleaners.

Repair of faults
Disconnect all units from power supply and have it repaired by a qualified service person if any of the following occurs:

- If any power cord or plug is damaged or frayed
- If a unit does not operate normally when operating instructions are followed
- If a unit exposed to rain/water or if any liquid has been spilled into it
- If a unit has been dropped or damaged
- If a unit shows a change in performance, indicating a need for service.

⚠ WARNING

Failure to adhere to these safety instructions may result in damage to the product or serious bodily injury.

RoHs
Our products are RoHs compliant.

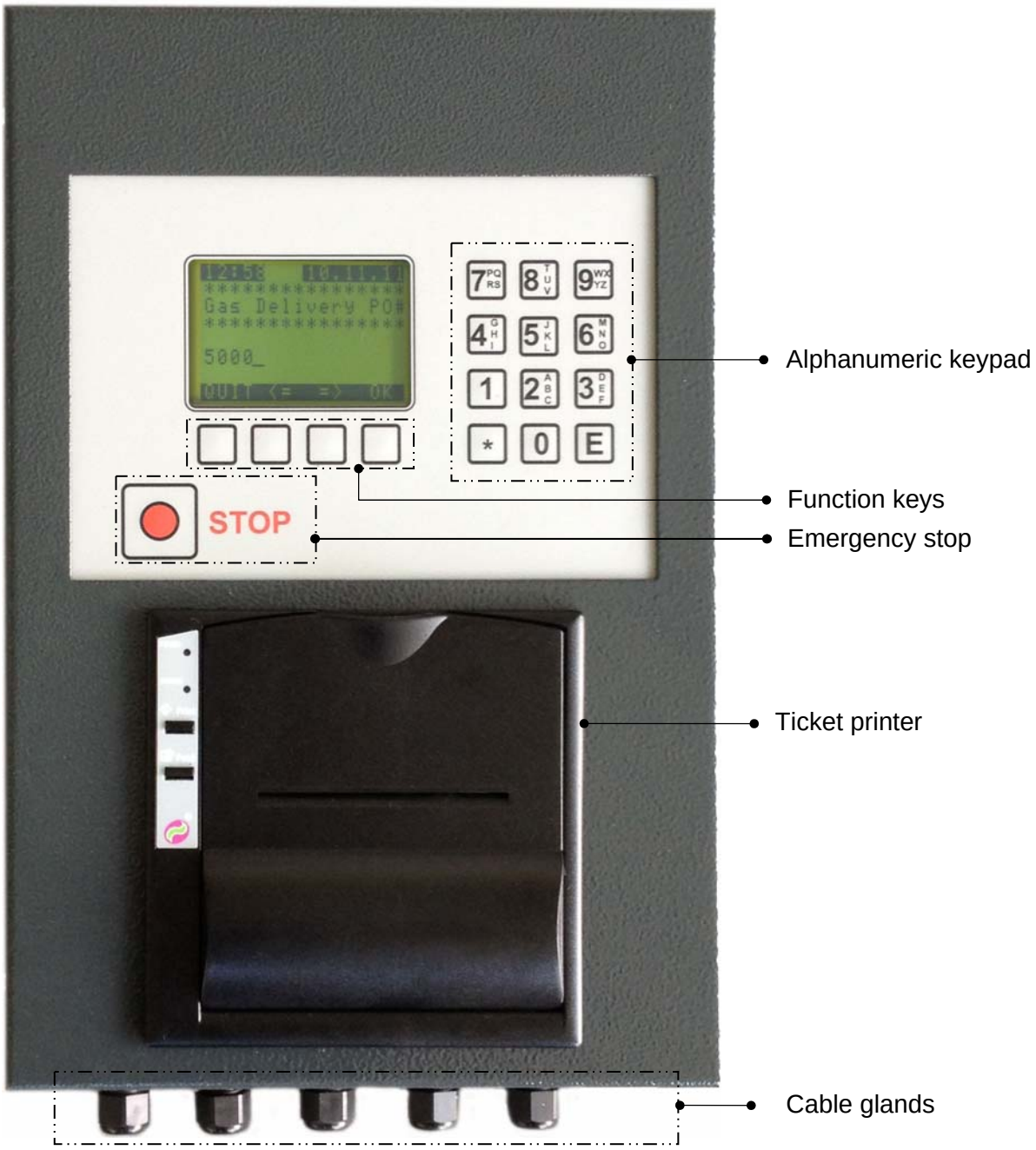
Battery disposal
The batteries contained in our products need to be disposed of as per your local legislation acc. to EU directive 2006/66/EG.

2. General description

2.1 Technical data

Dimensions	20cm (7.9") x 30cm (11.8") x 13cm (5.1") W x H x D
CPU:	Atmel, AT103 (AT128), 8-bit, serial flash, 128 K bytes of In–System programmable flash
Memory:	Flash, 1Mbit
Interfaces:	9-pole RS232 plug to be use as External printer, PC software or barcode reader Baudrate 9600 - Parity none - Databits 8, LF/CR
Firmware update:	With special serial adapter
Fuses	F1 = Fuse controller 1.00 AmT/SB 250V F2 = Fuse 12/24VDC 2.00 AmT/SB 250V F3 = Fuse int.printer 5.00 AmT/SB 250V F4= Fuse power supply 2.00 AmT/SB 250V
Pulse Input	4x NPN opto isolated
Valve Output	4x 24VDC, max.load 2A
Pump Control	Relais, max. load 2A at 250VAC or 30 VDC (or 115 VAC)
Transactions	2999 max.
User	99 max.
Protection class	IP57

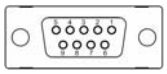
2.2 Front plate description



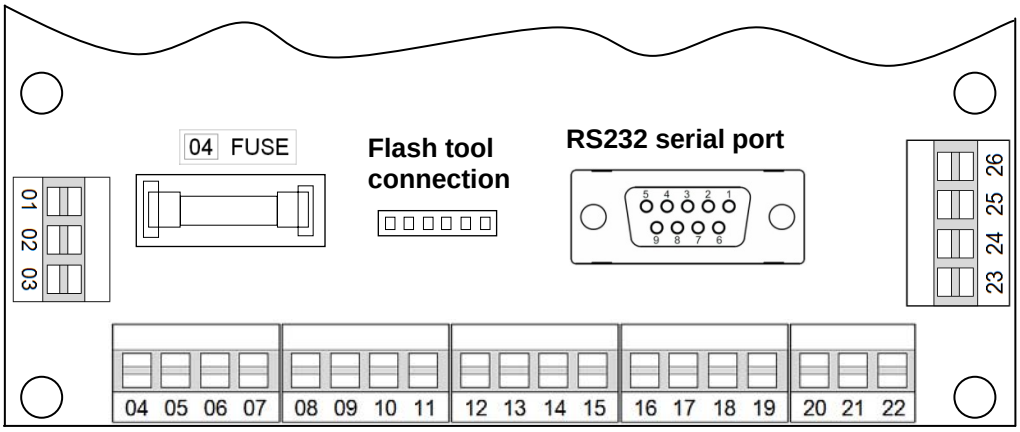
2.3 Connections

01	PE		16	Valve 3 - 24VDC/2A		3	
02	N		17	Valve 3 - GND			
03	L1 230VAC/50Hz		18	Pulse Input 3 +			
			19	Pulse Input 3 GND			
04	Valve 2 -24VDC/2A	2					
05	Valve 2 - GND		20	GND			
06	Pulse Input 2 +		21	+12VDC			
07	Pulse Input 2 GND		22	+24VDC			
08	Valve 1 - 24VDC/2A	1	23	Emergency Key			
09	Valve 1 - GND		24	Emergency Key			
10	Pulse Input 1 +		25	Pump Output Relay 5A/30VDC			
11	Pulse Input 1 GND		26	Pump Output Relay			
12	Valve 4 - 24VDC/2A	4	F1	Fuse 1.0A SB 250V	5VDC		
13	Valve 4 - GND		F2	Fuse 2.0A SB 250V	12/24VDC		
14	Pulse Input 4 +		F3	Fuse 6.3A SB 250V	Int.Printer		
15	Pulse Input 4 GND		F4	Fuse 2.0A SB 250V	230VAC		

RS232 Port for software or external printer



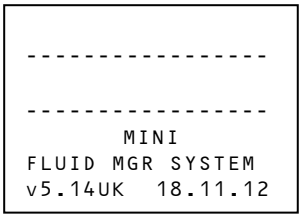
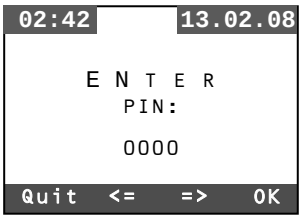
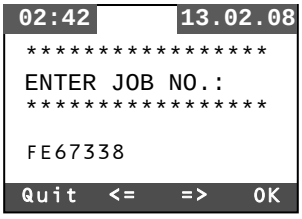
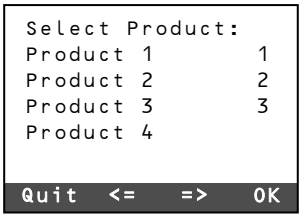
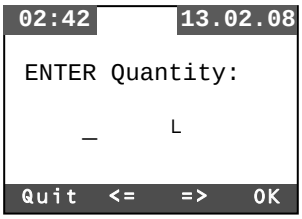
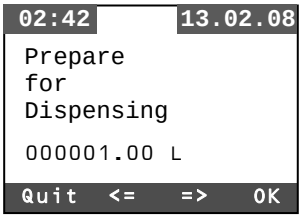
Note: 230 VAC standard, optional 115 VAC

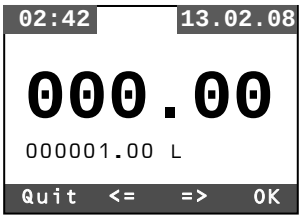


RS232 serial port
Ext. printer / PC software / Barcode reader
RXD = Pin 3
TXT = Pin 2
GND = Pin 7

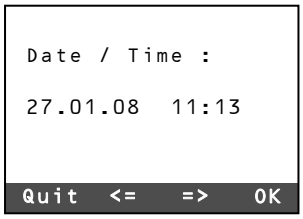
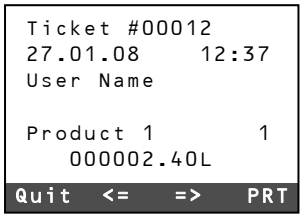
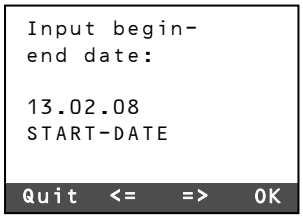
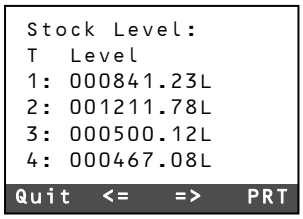
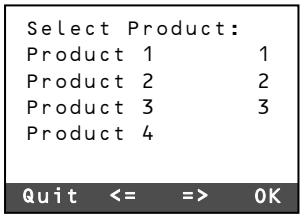
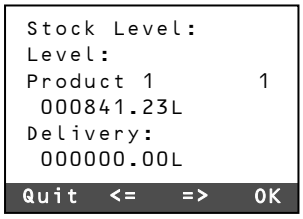
Flash tool connection
For firmware update only for service

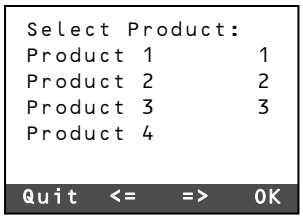
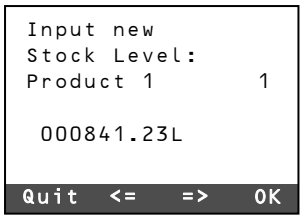
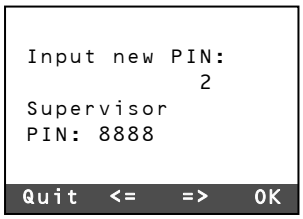
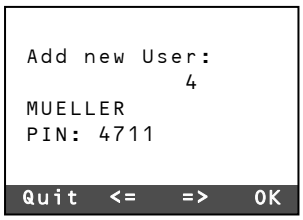
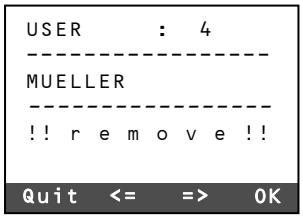
3. Standard dispense procedure

Startup screen - displays of firmware version	
Enter your 4-digit PIN-No. for the user 1111 (Default user by factory) Press key "OK"	
The user name is briefly displayed, the screen automatically move to the next menu. Enter your “order number”	
Enter your “Job Number” Alphanumeric entry, max. 15 digits Confirm with "OK"	
Select fluid type on keypad or with arrow keys. Confirm with "OK"	
Enter the requested quantity in liters. Confirm with "OK"	
The system is now ready to dispense the fluid.	

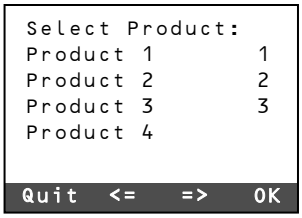
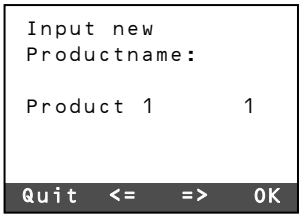
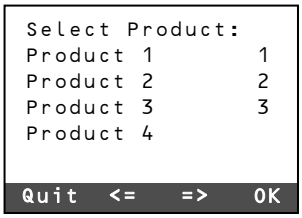
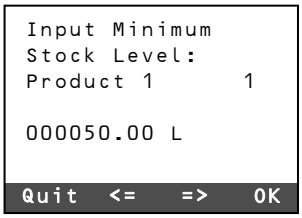
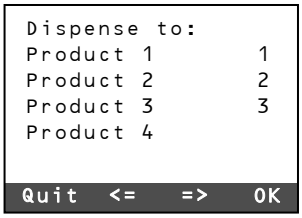
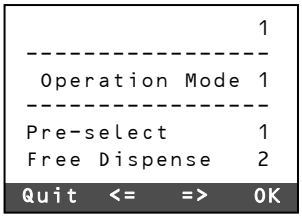
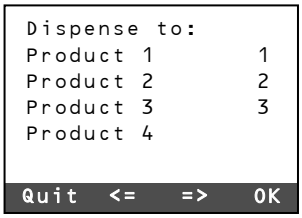
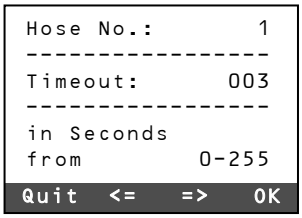
The display moves on count mode. Once the fluid has been dispensed, the attached solenoid valve will close and the internal printer will print a ticket.	

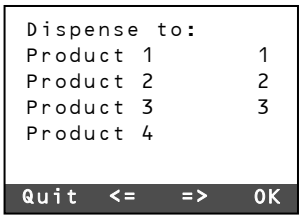
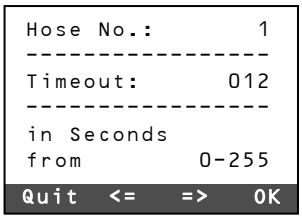
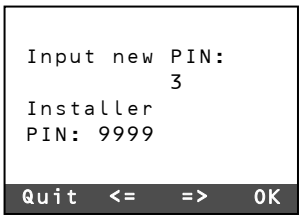
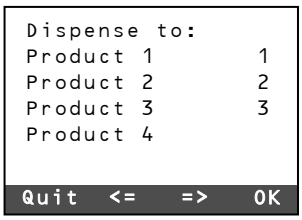
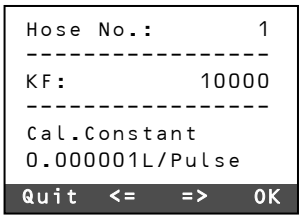
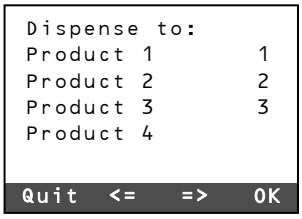
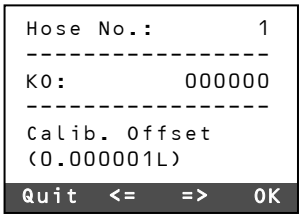
4. Supervisor menu: PIN 8888 (default)

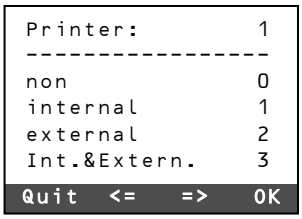
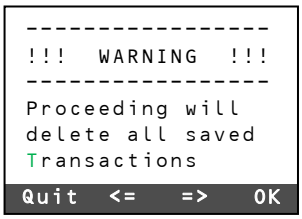
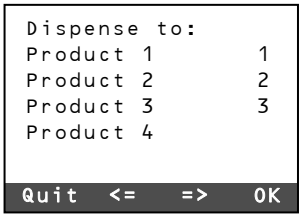
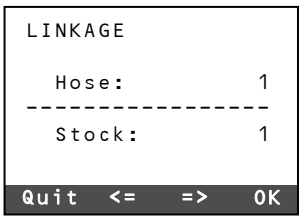
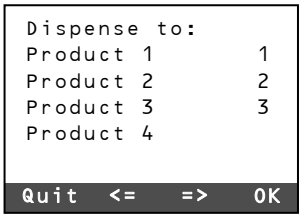
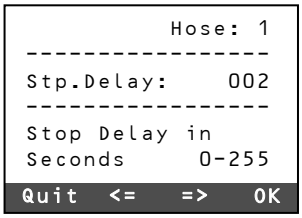
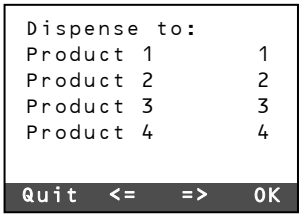
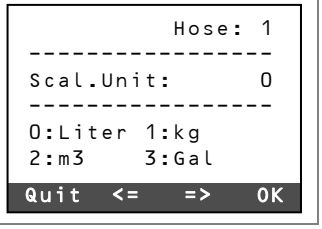
Set Date & Time	Defines date and time	
Transaction Rep	An older ticket can be printed again. Scroll with the left and right arrow to the desired transaction and select PRT. See chapter 7.3	
Print Report	Transactions report by date Choose the desired time frame and confirm with OK. Note: The external printer must be activated.	
Stock Level	Will print the actual stock levels Choose "PRT" to print or "Quit" to return	
Prod. Delivery	Fluid delivery can be added to the current stock (tank). Select a product and confirm with “OK” or return with “Quit”. Enter the delivered quantity and confirm with “OK” or return with “Quit”.	 

Set Stock Level	Tank level correction Select a product and confirm with “OK” or return with “Quit”. Enter the new stock (tank) level and confirm with “OK” or return with “Quit”.	 
Supervisor PIN	PIN 8888 can be changed. Enter the PIN number and confirm with “OK” or return with “Quit”. “Error” is displayed if the entered PIN number has already been allocated to another operator.	
Add new User	To add a new user: Enter new user name Enter PIN number with * key Enter PIN number on keypad Confirm with "OK" Return with "Quit"	
Delete User	To delete an user: Select user with arrow keys Confirm with "OK" Return with "Quit"	

5. Installer menu: PIN 9999 (default)

Products	Defines a new product name. Select a product and confirm with “OK” or return with “Quit”. Enter the new product name and confirm with “OK” or return with “Quit”.	 
Set Min Stock	Defines the minimum stock level (tank level), when system should give a warning message. Stock Level: 000000.00 L Select a product and confirm with “OK” or return with “Quit”. Enter the new minimum stock level and confirm with “OK” or return with “Quit”. Only firmware v4.0 and later: If the Set MinStock is set to zero, the warning is deactivated.	 
Set Mode	Normal preselection mode or free dispense mode. Preselect 1 Free dispense 2 Select a product and confirm with “OK” or return with “Quit”. Enter the new operation mode and confirm with “OK” or return with “Quit”. See also chapter: 9 Dispense modes	 
Initial Timeout	Defines the delay after the PIN n° entry until the valve opens and the batch starts. Select a product and confirm with “OK” or return with “Quit”. Enter the new timout and confirm with “OK” or return with “Quit”. See also chapter: 11 Dispense timing	 

Inact. Timeout	If the pulse input from the meter stops before the preselected quantity has been reached, the system will wait for the defined time before the batch stops and the valve closes (default 12 sec). Select a product and confirm with “OK” or return with “Quit”. Enter the new timout and confirm with “OK” or return with “Quit”. See also chapter: 11 Dispense timing	 
Install-PIN	PIN 9999 can be changed Enter the PIN number and confirm with “OK” or return with “Quit”. “Error” is displayed if the entered PIN number has already been allocated to another operator.	
Hose Calib.	Calibration or scale factor for each hose (meter). System expects 100 PPL, will be displayed as 1.00 L Note: Error caused by viscosity or density of the fluid. Calibration CF: 10000 (can be read as 1,0000) Select a product and confirm with “OK” or return with “Quit”. Enter the calibration factor and confirm with “OK” or return with “Quit”.	 
Hose Offset	Will correct a difference between the preselected quantity and the actual dispensed quantity. Note: Should be used by fix topoff error caused by a slow valve. Hose 1 CO: 000000 Calibr. offset 0.000001 l For example: CO: 003000 will shut off 0,03 l earlier. Select a product and confirm with “OK” or return with “Quit”. Enter the hose offset and confirm with “OK” or return with “Quit”.	 
Print Parameter	Will print the current configuration on the specified printer for each hose	No sub menu.

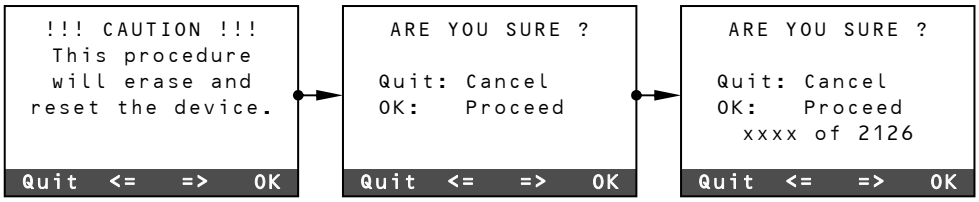
Setup Printer	Printer selection 0: No printer assigned 1: Internal ticket printer 2: External printer 3: Internal and external printer	
Clear Transact.	Deletes all stored transactions.	
Hose Linkage	Defines which hose (meter) will be linked to a certain stock (tank). Select a product and confirm with “OK” or return with “Quit”. Enter the hose linkage and confirm with “OK” or return with “Quit”.	 
Inac. Delay	Defines how long the pump will keep running once the dispense has been completed. Pump control has to be connected to terminal 25/26. See also chapter 2.3 and chapter 11	 
Scaling Unit	Unit can be selected Display Meter must supply 0,00 L >> 100 PPL 0,00 m3 >> 100 PPm3 = 0,1PPL 0,00 hl >> 100 PPhl = 1 PPL 0.00 Gal >> 100 PPG Select a product and confirm with “OK”, or return with “Quit”. Enter the unit and confirm with “OK” , or return with “Quit”. Only firmware v3.7 Unit: 0: Liter 1:m3 2:hl Only firmware v3.9 Unit: 0: Liter 1:kg 2:m3 Later firmware v5.0 Unit: 0: Liter 1:kg 2:m3 3:Gal	 

Special Mode	With Special Mode 0 the system will work as a standard Fluid Management System. Mode 1 and 2 are customized dispense scenarios. See chapter 9. Only firmware v5.0 and later	Special Mode: 0 ---------- Standard 0 Direct Mode 1 Additive Calc 2 Quit <= => OK
Scanner	Will activate barcode scanner function. See chapter 8. Only firmware v5.0 and later	Scanner: 0 ---------- Disabled 0 Enabled 1 Quit <= => OK
Max. Dispense	The maximum possible dispense: 4200,00 max. value (before 500) Only firmware v3.9 and later	Free Mode Max.Dispense 004200.00 (4200.00) Quit <= => OK
Ticket Count	The amount of tickets you would like to print.	Print Ticket ---------- Quantity: 1 (1 … 3) Quit <= => OK
Additive	This menu is only needed for Special Mode 2 See chapter 9.2 ppm = Parts per Million	Select Product: Product 1 1 Product 2 2 Product 3 3 Product 4 4 Quit <= => OK Product: Product 1 1 Factor: 100000 (ppm) Quit <= => OK
Dispense TO	Defines the maximum dispense time in seconds (10-600). 999 s will disable this function. If the dispense time is exeeded, the following message will be displayed: Dispense Alert Dispense time exeeded Printout will be started, X will indicate the Hose No.: Dispense time exeeded: X Only firmware v5.10 and later	Dispense Alert ---------- Timeout: 120 ---------- in seconds from 10 - 600 Quit <= => OK

6. General system reset

This function will reset and erase the FMS Compact (only firmware v3.9 and later)
Note: System will be set to factory default data.

Procedure:
Unplug the FMS Compact and press the button 1 and 2.
Keep the buttons pressed and plug in the power supply.

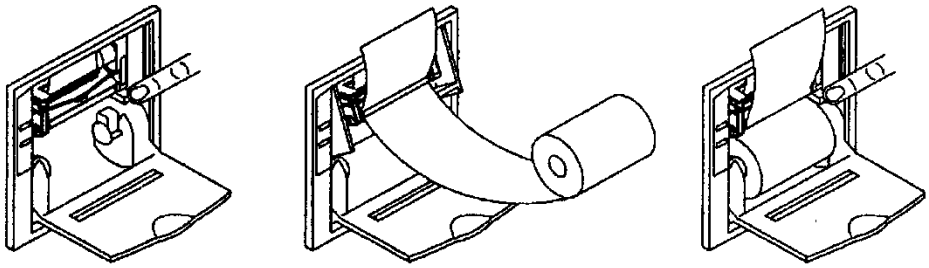


7. Printer

7.1 Internal ticket printer

To change the paper roll, please proceed as follows:

- Open the printer cover and press down "Push".
- Insert the end of the paper roll in the slit of the print mechanism and position the paper roll so that it rotates in the right direction, as shown below.
- The paper is automatically pulled by the roller for 3 or 4 cm.
- Tear off the paper and re-close the cover.



Note: Make sure the paper edge is straight before inserting it in the machine.

7.2 Internal or external ticket printer

```
25.05.11    15:12
H.Mueller
458534
SAE15W40         1
L        000004.52
```

7.3 External report printer

```
Date : 31.05.11              ** Transaction Report **            Time: 22:39

No.   Date     Time   Job Nr.         Qty.       Product         Technician

00017 25.05.11 15:12  458534          000004.52  SAE15W40        1  H.Mueller
00018 31.05.11 17:15  54215           000008.19  SAE30W40        2  H.Maier
00019 31.05.11 17:17  1200            000001.65  SAE30W40        2  H.Mueller
00020 31.05.11 17:18  52354           000001.76  SAE30W40        2  H.Mueller
00021 31.05.11 17:23  526585          000007.23  SAE15W40        1  H.Schulze
00022 31.05.11 17:30  585545          000005.15  SAE90           3  H.Mueller
00023 31.05.11 18:44  1234            000001.30  Gear oil        4  H.Mueller
00024 31.05.11 18:47  654852          000001.09  SAE30W40        2  H.Schulze
```

7.4 Configuration external printer

RS232	Baudrate 9600, Databit 8, Parity None, StopBit 1
Connection	25-pole D-SUB RXD PIN 3, TXD PIN 2, GND PIN 7

8. Barcode scanner

The serial port of the FMS Compact can be connected to a barcode scanner. It will work parallel to the existing keypad. You always have the choice to use the keypad or the scanner.

Note: If the barcode is activated, the PC software or external printer port cannot be used anymore.

Connection: RS232, D-Sub 25-pole, 9600 Baud, 8 DataBit, ParityNone, 1 Stop Bit

Recommended barcode scanner: Datalogic Gryphon, Datalogic Magellan 1000i

Barcode sample

PIN number		1111 [CR] [LF]
Job number		123456789012 [CR] [LF]
Hose selection		1 [CR] [LF]
Quantity		1.5 [CR] [LF]
Dispense start		*Start* [CR] [LF]

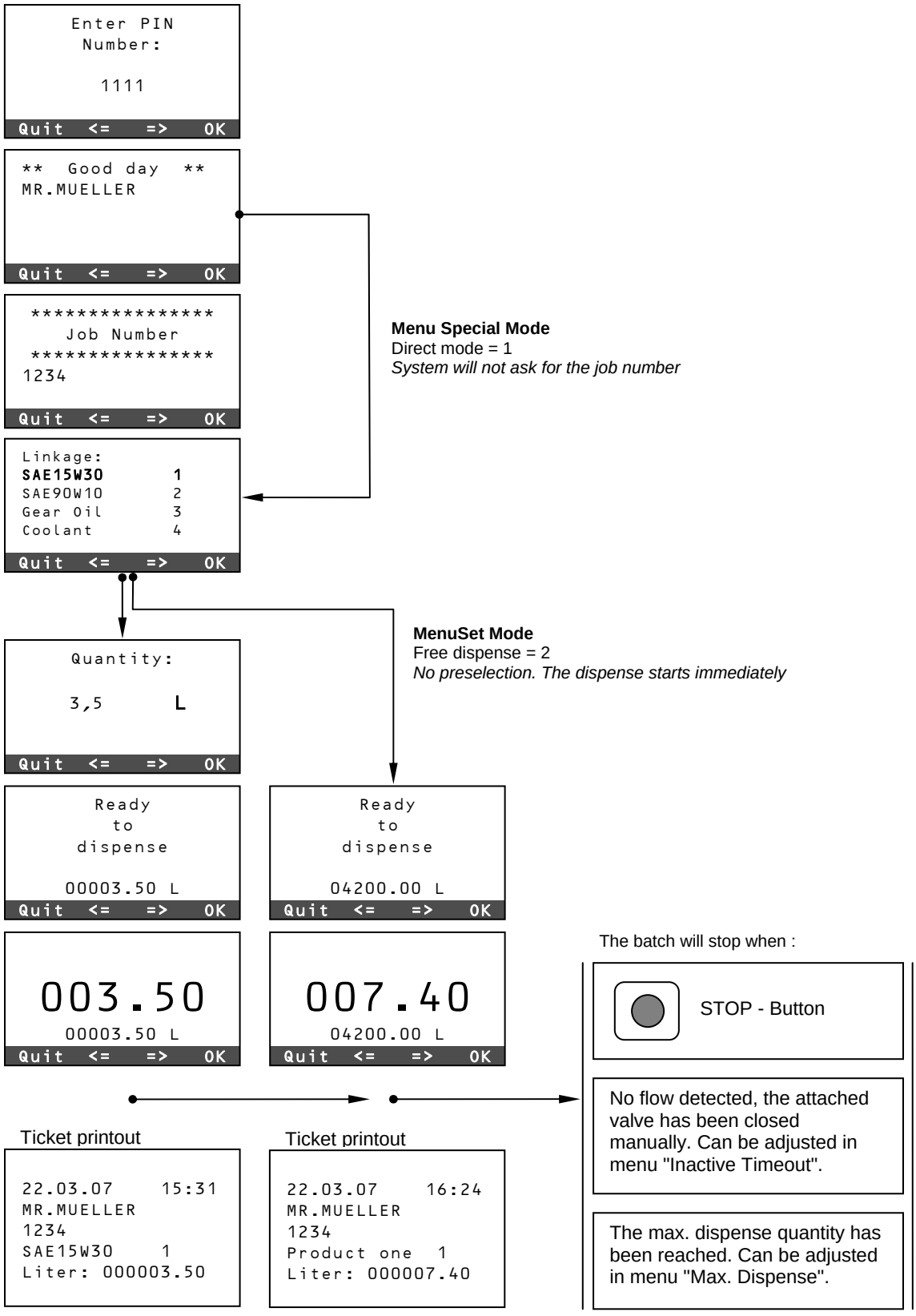
Quit		*STOP* [CR] [LF]
Enter		[0x14] [CR] [LF]

End suffix:
Each tranmission from the barcode scanner must be followed by a CR and LF control signal.
CR = ASCII (13) = Hex (0x0a)
LF = ASCII (10) = Hex (0x0d)

Barcode scanner only available in firmware v5.0 or later.

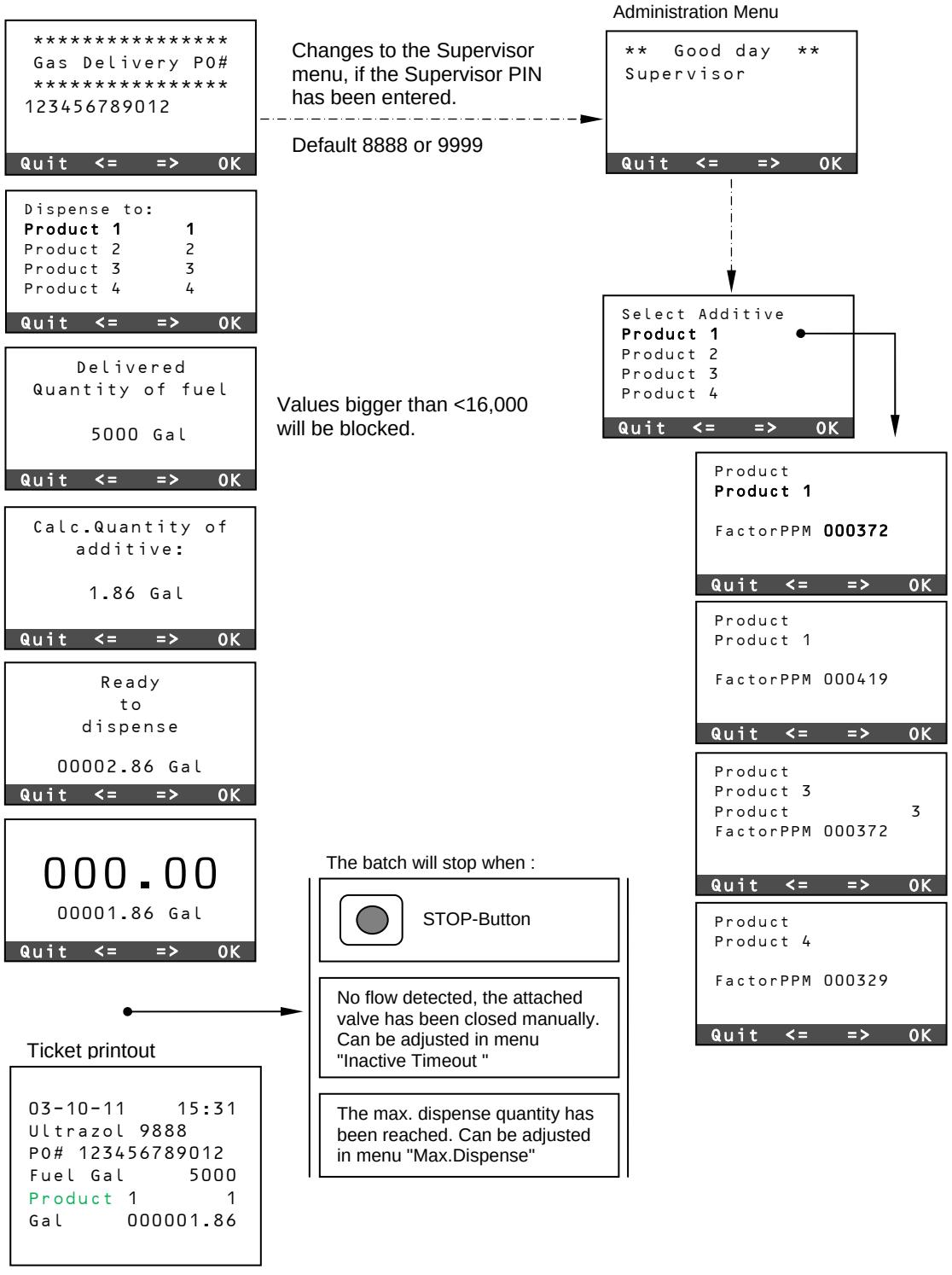
9. Dispense modes

9.1 Flow chart - Dispense Mode 0 and 1

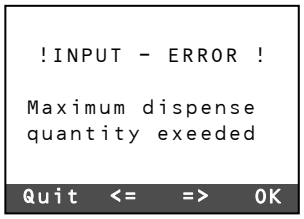
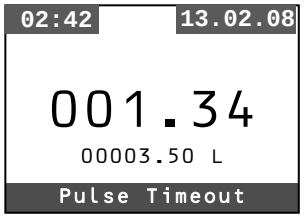
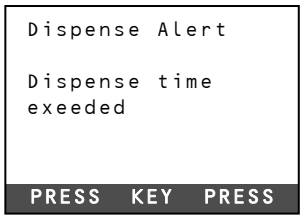
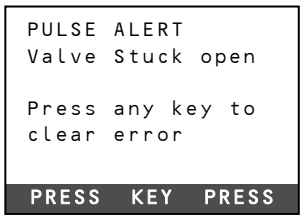


9.2 Flow chart - Dispense Mode 2

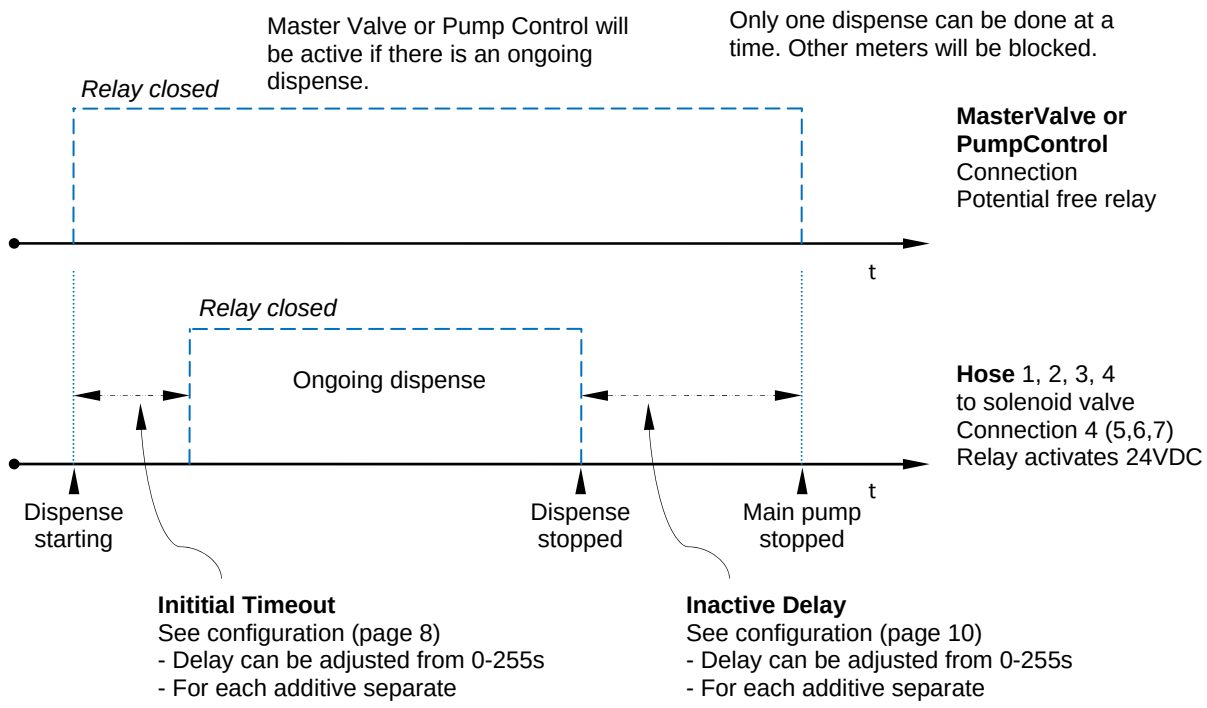
Customized dispense flow, will calculate a required quantity based on a preconfigured factor.
Dispense will start with the Job Number request, no PIN number entry requested.
System will use the first user as the default user.



10. Warning and status messages

	The requested quantity has been higher than specified quantity in the Menu Max.Dispense - Page 11
	Dispense has been stopped with "Pulse Time Out". No pulse are arriving from the meter, the Inactive Timout has been exeeded. See also page 9 - Inactive Timeout
	The minimum tank level has been reached, to be defined in the Menu Set Min Stock - Page 8
	The maximum allowable dispense time has been exeeded, to be defined in Menu Dispense TO - Page 11 Pulsating beep tone will start. Only firmware v5.10 and later
	An unexpected pulse input arrived while the solenoid valve is closed. A pulsating beep tone will start. If this problem persist, please ask the service personnel. A leaking valve could be the cause. Only firmware v5.10 and later and Dispense Mode 2

11. Dispense timing



Initial Timeout
See configuration (page 8)
- Delay can be adjusted from 0-255s
- For each additive separate

Inactive Delay
See configuration (page 10)
- Delay can be adjusted from 0-255s
- For each additive separate

12. Manufacturer´s declaration

Badger Meter Europa

CE

Herstellererklärung
Manufacturers Declaration

Bauart Typ ***Model Type***	Management System für Flüssigkeiten *Management System for fluids*
Typenbezeichnung ***Model Name***	MDS-2000, LMS-RF, LMS-Baby, FMS Compact *MDS-2000, LMS-RF, LMS-Baby, FMS Compact*
Seriennummer ***Serial Number***	Nach Komponenten gelistet *Listet by components*
Baujahr ***Construction year***	ab 1997 *from 1997*

Referenz / Reference:

Maschinen Richtlinien *Machine Directives*	CE-Richtlinien Elektrische Betriebsmittel *Electrical Device Directives*
unterliegt **nicht** dem Anwendungsbereich von 2006/42/EG nach Artikel 1 *isn't subjected to the application area of 2006/42/EG acc. to 1*	2006/95/EG CE Kennzeichnung *CE marking* 93/68/EEC

Hiermit bestätigen wir die Übereinstimmung unserer Geräte mit den o.g. Richtlinien.
Vor Inbetriebnahme der oben genannten Geräte muss sichergestellt sein, dass die Gesamtanlage bzw. Maschine, in der die Geräte verwendet werden, den geltenden Richtlinien und Bestimmungen entspricht.

We herewith confirm that our products are in accordance with above mentioned directives.
The equipment identified above must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of above directives.

08.11.2012

Unterschrift / Signature Geschäftsführer / Managing Director Horst Gras	Unterschrift / Signature QMB / Quality Control Ute Kneule

QM_MDS-ZF_CE_d_e_107.doc 11/12

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13. Warranty

Badger Meter warrants meters and parts manufactured by it and supplied hereunder to be free from defects in materials and workmanship for a period of 24 months from date of shipment. If within such period any meters or parts shall be proved to Seller´s satisfaction to be defective, such meters or parts shall be repaired or replaced at Seller´s option. Seller´s obligation hereunder shall be limited to such repair and replacement and shall be conditioned upon Seller´s receiving written notice of any alleged defect within 10 days after its discovery and, at Seller´s option, return of such meters or parts to Seller, f.o.b. its factory. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES WHATSOEVER INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES (EXCEPT OF TITLE) OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Badger Meter shall not be liable for any defects attributable to acts or omissions of others after shipment, nor any consequential, incidental or contigent damage whatsoever.

14. DIN ISO certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT
TÜV SÜD
Management Service
CERTIFICATE
The Certification Body
of TÜV SÜD Management Service GmbH
certifies that
Badger Meter Europa GmbH
Nürtinger Strasse 76
D-72639 Neuffen
has established and applies
a Quality Management System for
Flowmetering and Control,
Design, Selling and Production.
An audit was performed, Report No. 70002816
Proof has been furnished that the requirements
according to
ISO 9001:2008
are fulfilled. The certificate is valid until 2014-01-30
Certificate Registration No. 12 100 24674 TMS
IAF
Munich, 2011-02-01
QMS-TGA-ZM-07-92
TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstraße 65 • 80339 München • Germany
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